

Radioprotective Effects Against Chromosomal Damage Induced in Human Lymphocytes by γ -Rays as a Function of Polymerization Grade of Grape Seed Extracts

J. CASTILLO, Ph.D.,¹ O. BENAVENTE-GARCÍA, Ph.D.,¹ M.J. DEL BAÑO, B.S.,¹
J. LORENTE, Ph.D.,² M. ALCARAZ, M.D.,² and M.J. DATO, B.S.²

ABSTRACT

The quantitative distribution of flavan-3-ols was determined using high-performance liquid chromatography in several grape seed extracts (GSEs). In all GSEs, polymers of four or more carbon units were the group of procyanidins present in the highest concentration, the real quantity ranging between 60% and 99.5%. In a previous paper we established a relation between antioxidant and anticlastogenic activity of GSEs. A higher grade of polymerization in GSEs allows the existence of a higher number of conjugated structures and higher antioxidant activity. The radioprotective effects of GSEs with various grades of polymerization were determined by use of the micronucleus test for anticlastogenic activity, evaluating the reduction in the frequency of micronuclei in cytokinesis-blocked cells of human lymphocytes exposed to γ -rays. The radioprotective efficiency of GSEs was according to their grade of polymerization: GSE3 > GSE2 > GSE1 > dimethylsulfoxide. The higher antioxidant capacity and anticlastogenic activity of GSEs can be explained, structurally, by the high number of conjugated structures between the catechol groups in the B-rings and the 3-OH free groups of the polymeric polyphenolic skeleton and, in addition, by the stability of the aroxyl flavonoid radical generated in the processes.